

Name: _____

Review for quarter 3 exam. Please note this review is not comprehensive. You should study all class notes and homework assignments.

1) If $\log_9 x = \frac{3}{2}$, what is the value of x ?

A) $\frac{3}{2}$

B) 8

C) 27

D) $\frac{27}{2}$

2) If $\log_x 9 = \frac{1}{2}$ what is the value of x ?

A) 27

B) 81

C) 3

D) $4\frac{1}{2}$

3) The graph of $y = \log x$ lies in which quadrants?

A) *I* and *II*B) *II* and *III*C) *I* and *IV*D) *III* and *IV*

4) The expression $2 \log_5 m + \log_5 n$ is equivalent to

A) $\log_5 \left(\frac{2m}{n}\right)$

B) $\log_5 \left(\frac{m^2}{n}\right)$

C) $\log_5 \sqrt{mn}$

D) $\log_5 m^2 n$

- 5) If $\log 5 = a$, then $\log 250$ can be expressed as
- A) $2a + 1$ B) $50a$ C) $25a$ D) $10 + 2a$
- 6) The growth of a colony of cells can be determined by the formula $G = I(3.1)^{0.226t}$, in which G represents the final number in the colony, I is the initial number of cells, and t represents elapsed time in hours. Find how many hours it will take for a colony starting at 25 cells to increase to a size of 25,000 cells. *[Round the answer to the nearest whole hour.] [Show all work.]*
- 7) It has been shown that homes in a certain city increase in value at a rate of 7.5% per year. The value V of a home after t years is given by the formula $V = C(1 + r)^t$ where r is the rate of appreciation. If a home costs \$42,000 in 2001, by what year will this home have doubled in value? *[Show all work.]*

- 8) Sean invests \$10,000 at an annual rate of 5% compounded continuously, according to the formula $A = Pe^{rt}$, where A is the amount, P is the principal, $e = 2.718$, r is the rate of interest, and t is time, in years.
- (a) Determine, to the nearest dollar, the amount of money he will have after 2 years. [*Show all work.*]
- (b) Determine how many years, to the nearest year, it will take for his initial investment to double. [*Show all work.*]
- 9) A ball is dropped from a height of 8 feet and allowed to bounce. Each time the ball bounces, it bounces back to half its previous height. The vertical distance the ball travels, d , is given by the formula $d = 8 + 16 \sum_{k=1}^n \left(\frac{1}{2}\right)^k$, where n is the number of bounces. Based on this formula, what is the total vertical distance that the ball has traveled after four bounces?
- A) 23.0 ft B) 22.0 ft C) 15.0 ft D) 8.9 ft
- 10) Find the value of $\sum_{k=2}^5 (k-1)^3$.

- 11) What is the third term of the sequence defined by $t_1 = \frac{1}{3}$ and $t_n = 3t_{n-1} + 1$ when $n > 1$?
- A) 9 B) 5 C) 7 D) 11

- 12) What is t_{27} of the sequence 15, 10, 5, ...?
- A) -115 B) -75 C) $\frac{1}{625}$ D) 0

- 13) What is the sum of the series $3 + 12 + 21 + \dots + 597$?
- A) 19,200 B) 19,500 C) 19,800 D) 20,100

- 14) Find the common ratio of the sequence $8, -2, \frac{1}{2}, -\frac{1}{8}, \dots$?
- A) -4 B) -8 C) $-\frac{1}{8}$ D) $-\frac{1}{4}$

- 15) What is t_8 of the geometric sequence 6,561, -2,187, 729, -243, ...?
- A) -1 B) -3 C) 1 D) -9

- 16) Find the sixth term of the geometric sequence when $a_4 = -8$ and $r = 0.5$.

A) -2 B) 2 C) -4 D) 4

- 17) During a flu outbreak, a hospital recorded 8 cases the first week, 20 cases the second week, and 50 cases the third week.

(a) Write a geometric sequence to model the flu outbreak.

(b) If nothing could be done to prevent the spread of the flu, in which week would the total number of infected people exceed 12,000? [*Show all work.*]

- 18) The table below shows the December balance in a fixed-rate compound saving account each year from 1996 to 2000.

| Year | 1996 | 1997 | 1998 | 1999 | 2000 |
|---------|----------|----------|----------|----------|----------|
| Balance | \$20,000 | \$22,000 | \$24,200 | \$26,620 | \$29,282 |

What is the sum of the December balances from 1996 to 2006, inclusive? [*Show all work.*]

- 19) Solve for x : $\log_2(x - 3) + \log_2(x + 1) = 5$

A) $\{-7, 5\}$ B) $\{-5, 7\}$ C) 5, only D) 7, only

20) If $\log(x-3) + \log(x+4) - \log x = \log 5$, then the solution set for x is

- A) $\{2, 6\}$ B) $\{6\}$ C) $\{-6, 2\}$ D) $\{-2, 6\}$

21) Which of the following angles is coterminal with 915° ?

- A) 15° B) 195° C) 105° D) 75°

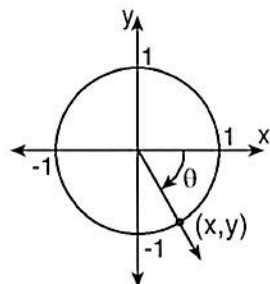
22) What is 600° converted to radians in terms of π ?

- A) $\frac{10\pi}{6}$ B) $\frac{5\pi}{3}$ C) $\frac{11\pi}{6}$ D) $\frac{10\pi}{3}$

23) A wedge-shaped piece is cut from a circular pizza. The radius of the pizza is 6 inches. The rounded edge of the crust of the piece measures 4.2 inches. To the nearest tenth, the angle of the pointed end of the piece of pizza, in radians, is

- A) 0.7 B) 7.0 C) 25.2 D) 1.4

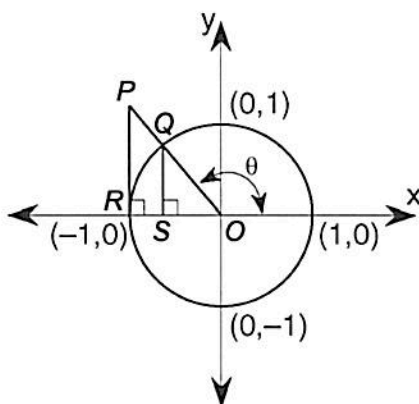
- 24) In the accompanying diagram of a unit circle, the ordered pair (x,y) represents the point where the terminal side of θ intersects the unit circle.



If $\theta = -\frac{\pi}{3}$, what is the value of y ?

- A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) $-\frac{\sqrt{2}}{2}$ D) $-\sqrt{3}$

- 25) In the accompanying diagram of a unit circle, \overline{PR} is tangent to circle O at R , $\overline{QS} \perp \overline{OR}$, and $\overline{PR} \perp \overline{OR}$.



Which of the following measures represents $\sin \theta$?

- A) \overline{PR} B) \overline{SO} C) \overline{QS} D) \overline{RO}

26) If $\sin x = -\frac{2}{3}$ and $\sin x \cos x > 0$, in which quadrant does angle x lie?

A) *I*B) *II*C) *III*D) *IV*

27) If $\cos \theta = -\frac{3}{4}$ and $\tan \theta$ is negative, what is the value of $\sin \theta$?

A) $\frac{7}{4}$ B) $\frac{\sqrt{7}}{4}$ C) $\frac{4}{5}$ D) $-\frac{\sqrt{7}}{4}$

28) The multiplicative inverse of $\sin^2(90^\circ) + \cos^2(90^\circ)$ equals

A) 0

B) undefined

C) -1

D) 1

29) The value of $\sin\left(\frac{3\pi}{2}\right) - \cos\left(\frac{\pi}{3}\right)$ is

A) $\frac{1}{2}$ B) $1\frac{1}{2}$ C) $-1\frac{1}{2}$ D) $-\frac{1}{2}$

30) If $f(x) = \cos 2x$, find the numerical value $f\left(\frac{\pi}{2}\right)$.

31) Evaluate: $\sin 90^\circ - \cos 270^\circ$

32) Which of the following is the reference angle of 280° ?

A) -10°

B) 80°

C) -80°

D) 100°

33) The value of $\sin (-210^\circ)$ is

A) $-\frac{\sqrt{3}}{2}$

B) $\frac{\sqrt{3}}{2}$

C) $-\frac{1}{2}$

D) $\frac{1}{2}$

34) The roots of the equation $x^2 + 6x + 11 = 0$ are

A) real, rational, and equal

B) imaginary

C) real, rational, and unequal

D) real, irrational, and unequal

35) What is the radius of a circle having the equation $x^2 + y^2 - 4x + 6y - 12 = 0$?

A) 16

B) 4

C) 5

D) $3\sqrt{2}$

